



Figure 3-6. Workers within the containment structure during the Early Waste Retrieval Project (1976 through 1978).

**3.1.5.4.2 1977 Early Waste Retrieval Project**—During 1977, the Early Waste Retrieval Project removed waste from Pit 2 and Trenches 8 and 10. A total of 240 buried drums (i.e., 50 m<sup>3</sup> of containerized waste) were retrieved. The project also retrieved 21.2 m<sup>3</sup> of loose waste and 6.4 m<sup>3</sup> of contaminated soil. Seventy percent of drums retrieved from Pit 2 and Trench 10 and all drums retrieved from Trench 8 were breached. Liquid leaked from approximately 9% of the drums, and 5% of these exhibited external contamination. Although alpha-contamination levels greater than 2E+06 cpm were frequently encountered, equipment and procedures effectively protected personnel and the environment.

The 1977 Early Waste Retrieval Project also supported several related waste-characterization studies. A TRU isotope migration study (Humphrey and Tingey 1978) indicated that contaminants (e.g., Pu-238, -239, -240, and Am-241) migrated less than 0.6 m (2 ft) from waste, but trace contamination migrated as far as 1.8 m (6 ft) from buried waste. This apparent migration was attributed to historical flooding in Pit 2. A container development study (McKinley and McKinney 1978b) resulted in purchasing a compactor to compact loose waste into 208-L (55-gal) drums. Contamination control studies (McKinley and McKinney 1978b) resulted in using a geotextile to manage dust.

A near-surface exploration of Pit 1 and Trenches 1, 5, 7, and 9 was conducted before the weather shield was moved to these areas. Near-surface exploration consisted of digging a trench from 0.9 to 1 m (3.3 to 4 ft) wide and perpendicular to the trenches, down to the top of buried waste. Drums in Pit 1 were stacked and in fair to good condition. No drums were externally contaminated, and direct radiation was less than 5 mR/hour. Numerous filters and frames were mixed with the drums. The filters exhibited contamination levels from 2E+03 cpm to greater than 2E+06 cpm, and their wooden frames were

deteriorated. Trench 1, which was opened on July 8, 1952, and closed on October 1, 1954, was positively identified by two drum tags, one dated August 20, 1953, and the other dated October 1, 1954. Waste containers in Trench 1 appeared to be almost completely disintegrated. Retrieved waste consisted of glass vials, metal filings, tubing, and gloves. Beta-gamma contamination levels were very low, and  $6\text{E}+03$  cpm was the highest alpha contamination level encountered. Trench 5, which was opened on November 4, 1955, and closed on March 29, 1956, also was identified by drum tags dated February 2, 1955. Drums had been dumped randomly and exhibited poor integrity. Low-level beta-gamma and alpha contamination was discovered on some drum contents, with direct readings up to 50 mR/hour. Contents appeared to be filters and graphite molds. Only a few drums were found in Trench 7. The majority of the waste was not contained and consisted of sample bottles, tubing, plastic, and several lengths of pipe. Waste had low-level beta-gamma contaminants, but no alpha contamination was detected. Trench 9, which was opened on January 17, 1957, and closed on September 6, 1957, was identified by drum tags dated May 13, 1957. Drums had been dumped randomly, but appeared to be in good condition. No external contamination was encountered on the drums. Miscellaneous loose waste (e.g., tubing, bottles, gloves, and a small cart) was mixed with the drums. Low-level beta-gamma contamination was detected on these items, but no alpha contamination was detected. The confinement building and other support equipment were removed from the weather shield in August 1977, and the weather shield was deflated and dismantled.

**3.1.5.4.3 1978 Early Waste Retrieval Project**—Early in 1978, anchor blocks for the Early Waste Retrieval Project weather structure were relocated and the weather structure was inflated over Pit 1 and Trenches 5, 7, and 9. The confinement building and other support equipment were placed in the weather structure, a new breathing air supply system was installed, and new operating procedures were developed. Retrieval operations resumed in February and continued through September 1978. The project retrieved 137 buried drums (i.e.,  $27.9\text{ m}^3$  of containerized waste), of which approximately 65% were breached. These drums were severely corroded, and several fell apart during retrieval. About 3% of the retrieved drums leaked liquid, with alpha-contamination levels ranging from  $2\text{E}+03$  to  $8\text{E}+04$  cpm. Many drums had fixed alpha contamination on their external surfaces ranging from  $2\text{E}+03$  to greater than  $2\text{E}+06$  cpm. One drum had contact radiation levels of approximately 300 mR/hour. Loose waste was retrieved from deteriorated wooden boxes. Alpha-contamination levels on the loose waste ranged from  $4.5\text{E}+03$  to  $2\text{E}+06$  cpm. Approximately  $1.1\text{ m}^3$  of loose waste, including metal cylinders and glass vials exhibiting beta-gamma contamination, were retrieved. An analysis of contamination in Trench 7, including liquid in vials, indicated Sr-90 and Cs-137 at 200 mR/hour. Approximately  $4.9\text{ m}^3$  of the retrieved waste was contaminated soil, and  $4.3\text{ m}^3$  was operations-generated waste.

**3.1.5.5 Pad A Penetration and Inspection.** Pad A was constructed in September 1972 for interim disposal of contact-handled radioactive waste containing less than 10 nCi/g of TRU radionuclides. Waste was placed on Pad A between September 26, 1972, and November 17, 1978. Many of the drums placed on Pad A contained Series 745 evaporator salts from Rocky Flats Plant. These drums were removed from Pits 11 and 12 in 1977 and 1978 during the Initial Drum Retrieval Project.

Pad A is an abovegrade disposal site originally measuring approximately  $73 \times 98\text{ m}$  ( $240 \times 320\text{ ft}$ ). Waste placed on Pad A was contained in  $4 \times 4 \times 8\text{-ft}$  plywood boxes and 55-gal drums. Plywood boxes were stacked five deep, while drums were placed in horizontal stacks up to 11 drums deep. Containers were held in place with soil berms during stack construction (see Figure 3-7). Pad A was closed using a 1-m (3.3-ft) -thick soil cover in July 1979. The Pad A ROD (DOE-ID 1994a) identified soil-cover contouring, slope correction, routine maintenance, monitoring, and institutional controls as the selected remedy for Pad A. Remedial actions responsive to the 1994 Pad A ROD were completed in April 1995 (Parsons 1995).



Figure 3-7. Pad A during emplacement of waste drums retrieved from Pits 11 and 12 during the Initial Drum Retrieval Project.

**3.1.5.5.1 1979 Pad A Penetration**—The condition of waste beneath the Pad A cover was first examined while preparing the remedial investigation for Pad A (Halford et al. 1993). Pad A was first penetrated from September 26 through October 12, 1979, and the focus was on waste placed in the extreme northern portion of Pad A (i.e., the oldest waste on the pad). Uncovered wooden boxes were in a state of advanced deterioration; however, the inner liners appeared to be in good condition. Metal drums, lids, and lock rings exhibited varying degrees of corrosion, but appeared to be essentially intact. Concern over the structural integrity of the drums precluded retrieving them; however, the wall thickness of 32 drums was measured in situ using an ultrasonic probe, and four of 32 drums (i.e., 13%) had walls thinner than the minimum specified for new U.S. Department of Transportation 17C drums.

Airborne radioactive contamination was monitored throughout the 1979 penetration and inspection activities using two high-volume air samplers, two alpha continuous air monitors, and one beta continuous air monitor; on no occasion did the filters show results above background. Soil-gas surveys and grab samples from a subsidence hole demonstrated VOCs were present within Pad A; however, the VOCs were concluded to have migrated most likely from known organic waste disposals in the eastern end of Pit 4. Analytic results for the 13 interstitial soil samples retrieved during this penetration apparently were lost.

**3.1.5.5.2 1989 Pad A Initial Penetration Project**—Pad A was penetrated again and inspected in 1989 as part of the RCRA Facility Investigation for RWMC (INEL 1988). Though no formal report was completed for this activity, results and observations are provided in detail in Section 2 of the RI/FS for Pad A (Halford et al. 1993). Phase 3 of the Pad A investigation involved penetrating Pad A in two locations, sampling interstitial soil between drums, and removing and sampling waste contents within